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HARD CHOICES

A Report on the Increasing Gap Between America's Infrastructure Needs and Our Ability To Pay for Them

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Appendix 13. NEW JERSEY

A CASE STUDY

PREPARED FOR THE USE OF THE

SUBCOMMITTEE ON ECONOMIC GOALS AND INTERGOVERNMENTAL POLICY

OF THE

JOINT ECONOMIC COMMITTEE
CONGRESS OF THE UNITED STATES

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Preface

Infrastructure problems are widespread. They do not respect regional or state boundaries. To secure a better data base concerning national and state infrastructure conditions and to develop threshold estimates of national and state infrastructure conditions, the Joint Economic Committee of the Congress requested that the University of Colorado's Graduate School of Public Affairs direct a twenty-three state infrastructure study. Simultaneously, the JEC appointed a National Infrastructure Advisory Committee to monitor study progress, review study findings and help develop policy recommendations to the Congress.

In almost all cases, the studies were prepared by principal analysts from a university or college within the state, following a design developed by the University of Colorado. Close collaboration was required and was received from the Governor's staff and relevant state agencies.

Because of fiscal constraints each participating university or college agreed to forego normal overhead and each researcher agreed to contribute considerable time to the analysis. Both are to be commended for their commitment to a unique and important national effort for the Congress of the United States.

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PARTICIPATING STATES AND RESEARCHERS

State	Researchers and Affiliation
Alabama	Niles Schoening University of Alabama
California	Fred Collignon University of California at Berkeley
Colorado	James Ohi University of Colorado at Denver
Florida	Earl Starnes Neil Sipe University of Florida
Indiana	Salmon Shah Morton Marcus Indiana University
Kentucky	Phillip W. Roeder Dennis B. Murphy University of Kentucky
Louisiana	James D. Schilling Louisiana State University
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NEW JERSEY'S INFRASTRUCTURE NEEDS:

A CASE STUDY

Prepared by

Robert W. Lake

Center for Urban Policy Research

RUTGERS UNIVERSITY, NEW BRUNSWICK, N.J.

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SUMMARY

Renewal of the nation's capital infrastructure is essential to support economic development, maintain the quality of life, and facilitate both private and public sector productivity. Despite its obvious importance, however, capital investment has seriously lagged the rate of inflation, resulting in deterioration of existing facilities and inadequate development of needed additional capacity.

This report summarizes capital infrastructure investment needs for the State of New Jersey for the period 1983-2000. The report provides:

(1) a summary of capital expenditures and needs in transportation, water supply, and wastewater disposal in the State of New Jersey;

(2) projections of revenues available to meet those needs; and

(3) an assessment of the gap between needs and revenues.

It must be stressed that the basic functional areas covered in this report -- transportation, water supply, and wastewater treatment and disposal -- represent only a partial list of the total capital infrastructure picture in the State. Additional areas including solid and hazardous waste management, flood protection, shoreline and beach protection, harbor development, and others represent critical issues for New Jersey. These additional areas have not been addressed in this report to provide comparability with other State case studies being prepared under the larger national infrastructure needs assessment of which this study is a part. Their importance should not be forgotten, however, in considering the full magnitude of New Jersey's infrastructure investment needs.

The basic finding of this study is the need for a far better, comprehensive, and systematic method for specifying infrastructure investment

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need than is currently available. New Jersey is fortunate in having a well-developed process of long-range capital budgeting and planning in key infrastructure areas. To the extent, however, that the capital planning process is constrained by expected revenue flows, absolute need is not always fully reflected in capital planning documents. Thus, needs summarized in this report based on long-range planning may significantly underestimate absolute need identified without regard to revenue constraints. The absence of such unconstrained needs assessment represents an important gap in our ability to completely and accurately measure the full scale of needed investment in infrastructure renewal.

Study findings for each of the basic substantive areas are summarized as follows.

Highways and Bridges

New Jersey's 33,396 miles of streets and highways and 5,786 bridges are among the most heavily traveled in the nation. Data on the current condition of State roads and bridges reveal the need for a major commitment of revenues for maintenance and rehabilitation. Only 16 percent of State roads are rated as good or very good; 44 percent are rated fair, 38 percent are poor, and 2 percent are very poor. Similarly, 16 percent of the State's bridges are rated as either fair or poor. The New Jersey Department of Transportation (NJDOT) has identified a current existing backlog of $1.5 billion in needed maintenance and rehabilitation for the State's roads and bridges.

Total highway and bridge investment needs for 1983-1989 total $7.0 billion, or $995 million annually.

Railroads

The primary direct State involvement in rail operations, under the jurisdiction of NJDOT's Office of Freight Services, pertains to the acqusition, rehabilitation, and maintenance of rail lines abandoned by Conrail but deemed critical to the State's economic well-being. The Office of Freight Services projects a total of $26.9 million in needed revenues for rail acquisition and rehabilitation for the period 1983-1990, or $3.4 million on an annual basis.

Mass Transit

New Jersey's extensive public transportation system, under the jurisdiction of the New Jersey Transit Corporation (NJ TRANSIT), encompasses a 490 route mile commuter rail network and nearly 14,500 route miles within the commuter bus system. The major emphasis in investment requirements for public transportation is on maintaining and revitalizing existing facilities, rather than in significant expansion or new construction.

Investment needs for 1983-1988 identified by NJ TRANSIT include $867.9 million in commuter rail improvements and upgrading, $704.7 million in transit bus facility expenditures, and $214.3 million in system support projects, for a total investment need of $1.8 billion, or $297.8 million annually.

Airports

Of New Jersey's 33 public use airports, 4 are rated in excellent condition, 23 are in good condition, and 6 are in fair condition. Long-range airport development plans prepared by NJDOT identify investment needs for new construction of terminal buildings, access roads, fire and rescue buildings, and the like, as well as for purchase and upgrading of facilities and equipment.

Capital investment needs for 1982-2000 for airport construction, rehabilitation, and upgrading total $177.3 million, or $8.4 million on an annual basis.

Water Supply, Treatment, and Distribution

The water supply system in the State of New Jersey encompasses an extremely complex and multilayered network of public water departments, private water companies, water authorities, and State-operated utilities. Parts of this extensive system are well over a hundred years old, dating in some cases to the pre-Civil War era, encompassing rehabilitation and replacement costs of significant magnitude.

The Water Supply Master Plan developed by the New Jersey Department of Environmental Protection (DEP) identifies several critical elements in need of attention. These include declining water quality, inadequate interconnections between systems, needed additional source development and controls over ground water resources, and rehabilitation of distribution systems.

Total investment needs for these purposes for 1981-1985 are calculated at $836 million, or $167.2 million annually.

Wastewater Disposal

As in the case of water supply, the State's wastewater disposal system is composed of an extensive decentralized network of municipal and regional facilities. Also similar to the water distribution system, many components of the wastewater disposal network date back to the Civil War period, and require substantial rehabilitation and replacement.

The 1982 Needs Survey conducted by Federal EPA and the State Division of Water Resources has identified wastewater disposal needs in terms of both current backlog and projected needs to 2000. This cost totals $6.2 billion, or $327.1 million annually.

Projected Revenues

Revenues for capital infrastructure investment needs come from a variety of sources including Federal funds, the State General Fund, General Obligation Bonds, and municipal and county local revenues. Projecting future revenues from any of these sources beyond the very short term is highly problematic due to obvious uncertainties of income growth, federal transfers, budgetary priorities, and the like.

Assumptions behind our revenue projections for infrastructure in the State include:

* 1 percent of General Fund revenues spent on capital projects;
* infrastructure elements included in this report amount to 60 percent of total capital spending;
* $200 million in General Obligation Bonds per year, of which 50% are allocated to the infrastructure elements covered in this report;
* 7 percent of local government outlays for capital spending, 60% of which apply to uses discussed here.

Based on these assumptions and the most current evidence of anticipated Federal transfer payments, projected revenues for infrastructure on an annualized basis total $962 million.

The Revenue Gap

The gap between investment needs and projected revenues is summarized in Exhibit A. Annualized investment need for transportation, water supply, and wastewater disposal totals $1.8 billion. Revenues available on an annualized basis total $962 million, for an annual average deficit of $837 million. Extending this amount yields a revenue gap of $4.2 billion for the period 1983-1987, a gap of $10.9 billion for 1988-2000, and a total deficit of $15.1 billion over the period 1983-2000.

The New Jersey Infrastructure Bank proposed by the Governor and currently under consideration in the Legislature represents a potential highly innovative mechanism for funding capital investment in the State. A continuing effort at clarifying the magnitude of need is an important complement to the success of this project.

EXHIBIT A

SUMMARY OF CAPITAL INVESTMENT NEEDS
AND REVENUES, 1983-1987
(in millions of 1982 dollars)

Investment Needs	Period	Total Need	Annual Average Need
Highways and bridges	1983-1989	$6,966.3	$ 995.2
Rail freight	1983-1990	26.9	3.4
Public transportation	1983-1988	1,786.9	297.8
Airports	1982-2002	177.3	8.4
Water supply	1981-1985	836.0	167.2
Wastewater treatment	1982-2000	6,215.0	327.1
TOTAL NEEDS			$ 1,799.1

Revenues	Period	Total Revenues	Annual Average Revenues
State General Fund	1983-1987	215.7	43.2
G.O. Bond Funds	1983-1987	500.0	100.0
Federal monies			
Highways	1983-1986	1,153.0	288.0
Mass transit	1983-1986	600.0	150.0
Airports	1982-1987	32.5	5.4
Wastewater treatment	1983-1987	385.0	77.0
County and municipal	1983-1987	1,491.0	298.2
TOTAL REVENUES			961.8
ANNUAL DEFICIT			($837.3)
Deficit 1983-1987			($4,186.5)
1988-2000			($10,884.9)

INTRODUCTION

The need for a major national investment in capital infrastructure renewal has become a common theme in both the political consciousness and the public media. Newsweek magazine has reported on "The Decaying of America."[1] Revenues from the 5-cent-a-gallon increase in the gasoline tax approved by the 97th Congress are dedicated to filling long-delayed mass transit and highway needs. Both major political parties have articulated a commitment to "Rebuilding America."

The importance of infrastructure provision and maintenance has been amply documented and need not be discussed in detail here. Numerous basic issues have been addressed in the literature:

* Economic development. Availability of adequate public works facilities is a prerequisite for attracting -- and keeping -- private sector economic activity. Surveys conducted by the Institute of Public Administration and the Economic Development Administration show that the adequacy of public infrastructure ranks ahead of both local tax incentives and industrial revenue bond financing in corporate locational decision-making.[2] Deteriorating public facilities indeed work against local economic development programs seeking to attract private sector investment.

* Multiplier effects. In addition to supporting private sector investment, public sector capital spending itself represents a potentially substantial injection of funds stimulating second-round local and regional economic growth. A study of the New York-New Jersey region prepared by the Regional Plan Association

calculated that an annual investment of $6.5 billion in needed infrastructure renewal would generate 120,000 new jobs and an estimated 2.5 percent increase in Gross Regional Product.[3] The renewal of basic infrastructure had the highest job multiplier of sixteen regional economic development strategies identified in the RPA report.

* Quality of life. Direct economic implications aside, local public works are critical to sustaining adequate environmental quality and residential satisfaction. Water supply, wastewater treatment, transportation facilities, and the like are essential in support of consumption as much as production.

* Public sector productivity. Deferred maintenance and the diversion of capital funds for operating expenses are short-term expedients with a heavy price tag.[4] Deteriorating facilities and equipment reduce productivity of municipal workers and thereby increase the burden on municipal operating budgets. Defering maintenance increases the cost of doing maintenance, as minor repairs deteriorate into major rehabilitation and eventually into replacement.

* Constituency. The large-scale, high-cost nature of infrastructure development and maintenance raises difficult issues of constituency-building.[5] The inability of any one potential user to internalize the costs -- and monopolize the benefits -- of system development and maintenance produces the tendency to "let someone else do it" -- the classic free-rider problem. Generating broad support for the necessary large-scale investment in what is often an invisible product is a difficult political issue.

Investment Trends

In spite of -- or perhaps because of -- these issues, recent years have witnessed a downward trend in capital investment nationwide. Total capital investment in constant dollars declined from $33.7 billion in 1965 to $24 billion in 1980, a drop of 30 percent. The decrease was even more rapid on a per capita basis, declining 36 percent from $174/person in 1965 to $110/person in 1980. Public works spending represented 3.6 percent of GNP in 1965 but only 1.7 percent by 1980. These trends result in part from the major boost in capital spending in 1957 and extending through the 1960s. The peak year was 1968, when the $41 billion spent in capital improvements comprised 4 percent of GNP.

Capital spending within the New Jersey-New York region mirrored these national trends, although as reported by the Regional Plan Association, public capital outlays rose somewhat less sharply in the 1960s and fell more rapidly in the 1970s.[6] Throughout the 1960s, the region invested an average of $2 billion a year in capital improvements, with a growth of 22 percent between 1957 and 1967. Investment peaked in 1972 at more than $4 billion, an amount equal to 3 percent of Gross Regional Product (GRP) and 9 percent of all public capital outlays nationwide. By the end of the 1970s, the real dollar value of capital investment was less than it had been twenty years earlier, amounting to 1 percent of GRP. Per capita rates of spending that had remained relatively stable at $150/person between 1957 and 1977, fell to $75/person by 1980, well below the national average of $110/person. The RPA report concludes, in summary, that with a slowing of investment and accelerating depreciation of an aging capital stock, "...the Region has been subjected to negative capital formation, or a condition of public disinvestment, for some time."[7]

Study Objectives

The pattern and consequences of this disinvestment have received growing public recognition in recent months. Largely lacking in this flurry of attention, however, has been a firm command of the magnitude of need as well as an ability to estimate the scale of funding necessary to meet that need. A recent report prepared by the Port Authority of New York and New Jersey summarized the current situation: "Although there is a growing concern for the condition of this infrastructure, there appears to be little or no information as yet developed on the scope and magnitude of this problem."[8]

This New Jersey case study represents an initial building block in the attempt to fill this gap. Together with parallel case studies simultaneously being prepared in Colorado, Texas, Indiana, and other states this effort will contribute to an overview of comparable infrastructure needs across the several states, and will allow for an assessment of similarities and differences across regions. As importantly, it will help to identify the status of information availability and data needs in a comparative framework, and thus constitutes the first step toward establishing a national data bank on infrastructure condition and investment needs. The report aims at initiating policy discussion and identifying gaps in the data rather than providing precise measures of needs and revenues. Towards these ends, the study provides:

(1) a summary of public sector capital spending over the six-year period 1977-1982, in major infrastructure categories;

(2) estimates of future investment needs, in both substantive units and required capital outlays, in major infrastructure categories, for the period 1983-87 and, where possible, 1988-2000;

(3) projections of future revenues, by source, available to meet these needs; and

(4) an estimate of the gap between estimated needs and projected revenues.

The New Jersey Case Study

New Jersey was chosen as a case study because it represents a highly-urbanized Northeast "frost-belt" state in which problems of maintenance and replacement of a seriously aging infrastructure exist alongside requirements for expansion and new construction associated with continuing growth.

New Jersey by many measures ranks as the most urbanized state in the Union. Fully seventeen of the State's twenty-one counties and 91 percent of the State's population were within SMSA boundaries in 1980. At 986.2 persons/square mile, population density in the State ranks first in the nation and far exceeds the figure of 64 persons/square mile for the country as a whole.

Population projections prepared by the New Jersey Department of Labor and Industry anticipate a growth rate of approximately 1.1 percent a year between 1980 and 2000, roughly comparable to the national average. This slow overall growth rate conceals a substantial degree of mobility and differential growth within the State. Population losses from the older cities in the northern part of the State have been more than offset by substantial growth in the southern coastal fringe and the central and western counties, confronting the State with the simultaneous problems of managing growth and buffering decline. Significant shifts have been recorded within the economy as well with manufacturing, accounting for 31 percent of total employment in 1972, representing only a fourth (25.6

percent) of non-agricultural jobs by 1980. In contrast, the share of jobs in services, government, and the finance-insurance-real estate (FIRE) sector all increased during the period. Per capita income in the State of $10,924 in 1980 ranked fourth in the nation.

The extreme diversity of land use patterns, economic mix, and development density within the State presents a substantial challenge to the capital planning process. Newark, the largest city in the State, has a water supply system comprising some 535 miles of pipe, 85 percent of which is constructed of unlined cast iron pipe installed prior to 1930; some mains date back to 1853. Of the city's 290 miles of sewer lines, better than 20 percent consist of large diameter brick sewers constructed in the 19th Century. Disintegration of the mortar between the bricks has caused several sewers to collapse, in some instances accompanied by the collapse of the street above. Coexisting with these problems of aging and often outmoded systems are other problems engendered by rapid population growth and development in heretofore outlying and largely agricultural areas of the State.

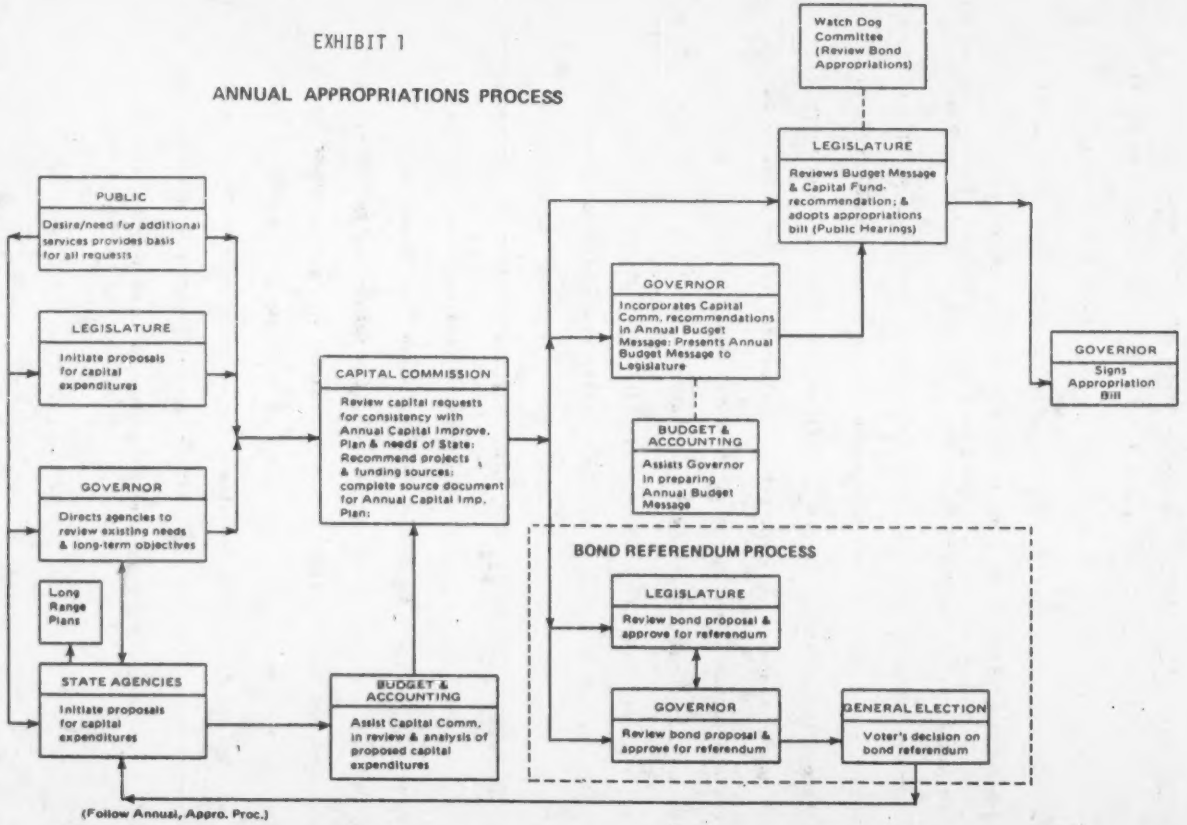
In spite of the complexity of the problems and the clear evidence of need, however, New Jersey has been hard hit by recent trends in intergovernmental revenue flows. Per capita federal expenditures in the State for highways and sewers, the major infrastructure systems receiving federal funds, amounted to only $37 in 1979, well below the national average of $51. This figure placed New Jersey fourth from the bottom among the fifty states (tied with Connecticut and Indiana), with only Michigan, Texas, and California receiving a lower level of federal expenditures on a per capita basis.

The Capital Planning Process. Awareness of the need for careful and systematic capital planning has been widespread in the State for a considerable time. The Governor's Commission to Evaluate the Capital Needs of New Jersey (the MacNaughton Commission) issued its report in 1975, with recommendations for needed capital investment in environmental resources, transportation, housing, public institutions, and a broad range of other infrastructure components. Its recommendations for public capital outlays for environmental resources and transportation alone totalled $7.2 billion for the 1976-1980 period. Also among the Commission's recommendations was the creation of a permanent New Jersey Commission on Capital Budgeting and Planning, which was established in 1975, the same year the MacNaughton Commission's report was released.

The N.J. Commission on Capital Budgeting and Planning serves in an advisory capacity to the Governor and the Legislature and is charged with preparing an annual Capital Improvement Plan (CIP). The CIP represents the Commission's annual recommendations for capital projects and funding sources, culled on a priority basis from the capital requests initiated by the various State Agencies (Exhibit 1). The process of establishing funding priorities thus passes through at least five discrete steps: (1) the sub-Departmental level in the various Divisions and State Institutions; (2) the Departmental level where Divisional needs are assigned priorities; (3) the Commission on Capital Budgeting and Planning which reviews Departmental capital requests and forwards its recommendations to the Governor in the form of the CIP; (4) the Governor's Office in preparing the budget message; and (5) the Legislature where appropriations are passed.[9]

EXHIBIT 1

ANNUAL APPROPRIATIONS PROCESS


Watch Dog Committee (Review Bond Appropriations)
LEGISLATURE
Reviews Budget Message & Capital Fund-recommendation; & adopts appropriations bill (Public Hearings)
PUBLIC
Desire/need for additional services provides basis for all requests
LEGISLATURE
Initiate proposals for capital expenditures
GOVERNOR
Directs agencies to review existing needs & long-term objectives
Long Range Plans
STATE AGENCIES
Initiate proposals for capital expenditures
CAPITAL COMMISSION
Review capital requests for consistency with Annual Capital Improve. Plan & needs of State: Recommend projects & funding sources: complete source document for Annual Capital Imp. Plan:
BUDGET & ACCOUNTING
Assist Capital Comm. in review & analysis of proposed capital expenditures
GOVERNOR
Incorporates Capital Comm. recommendations in Annual Budget Message: Presents Annual Budget Message to Legislature
BUDGET & ACCOUNTING
Assists Governor in preparing Annual Budget Message
GOVERNOR
Signs Appropriation Bill
BOND REFERENDUM PROCESS
LEGISLATURE
Review bond proposal & approve for referendum
GOVERNOR
Review bond proposal & approve for referendum
GENERAL ELECTION
Voter's decision on bond referendum
(Follow Annual, Appro. Proc.)

Source: New Jersey Commission on Capital Budgeting and Planning, Annual Capital Improvement Plan.

The New Jersey Infrastructure Bank. A major potential innovation in the method of funding capital investment in the State is represented in the Governor's proposal for a New Jersey Infrastructure Bank. The Infrastructure Bank proposal calls for creation of a revolving loan mechanism for funding local capital needs including water supply, wastewater treatment, transportation, and resource recovery. Capitalization for the Bank would be provided from (1) unobligated proceeds from previously authorized General Obligation bonds; (2) Federal grants that presently go directly to municipalities; (3) direct State appropriations; (4) dedicated tax revenues, such as the proposed two-cent per gallon portion of the gasoline tax; and (5) private capital investments. These funds would be used to provide loans or grants to local and county governments for capital improvements, and may be used for state projects as well. Interest payments on these loans (some loans may be interest-free), possibly financed through user charges, would be reinvested in the Bank together with the proceeds from temporary investments to provide a growing source of capital for an ongoing cycle of investment. The proposal would require Congressional approval (to authorize deposit of grant funds and their reissuance as loans) and approval by New Jersey voters in a referendum (to authorize the deposit of previously-approved bond funds). While the concept has raised questions concerning the imposition of another level of government between federal funding sources and local municipalities, the proposal offers the potential for further rationalizing and coordinating capital investment planning and budgeting in the State, and may serve as a prototype for other states to follow.

Infrastructure Expenditures, Needs, and Revenues

The following sections summarize recent trends in capital outlays, provide estimates of investment needs over the next several years, and project the availability of revenues to meet those needs. The discussion focuses on the basic infrastructure categories of transportation (including roads and highways, bridges, mass transit, and airports); water supply, storage, treatment, and distribution; and wastewater collection and treatment. These categories are common to each of the case study states and allow for comparability across the case studies. Additional capital needs relevant to the New Jersey case include ports and harbors, beach and shore protection, flood protection, and hazardous waste disposal; discussion of these issues has been deferred to assume uniformity of coverage.

The case study considers primarily the publicly funded component of infrastructure investment. Infrastructure provided wholly within the private sector is beyond the purview of this report, and is assumed to be self-supporting. In the case of capital systems funded jointly by public and private provision of services, as in the case of water distribution, the public component of expenditures, needs, and revenues is emphasized, and data on the private share are considered to the extent they are available.

Data on recent expenditure trends have been obtained from the annual State budgets, from the Annual Capital Improvement Plan prepared by the Commission on Capital Budgeting and Planning, and from interviews with and information provided by staff of the Department of Transportation, Department of Environmental Protection, and the Division of Budget and Accounting of the Department of the Treasury. This record of recent expenditures provides insight on the relative spending priorities among

infrastructure categories established in the past, on the assumption that expenditures have been made on a priority basis. In addition, the data indicate the scale of funding that has been available in the recent past, the direction of trends in such funding availability, and the changing mix of funds by source. Given the assumption of no major fundamental change in revenue conduits, these data also provide estimates of the general magnitude of funds likely to be available over the next several years.

Documentation of investment needs has rested almost entirely on needs assessment and long-range capital planning activities undertaken by the respective State agencies. New Jersey is fortunate in having undertaken extensive long-range planning for capital needs in the areas of transportation, water supply, and wastewater treatment. Taken together, these planning documents provide a solid base for estimating total investment needs through 1989 and in some cases to 2000. In addition, the most recent (1982-83) Annual Capital Improvement Plan provides detailed funding needs on an annual basis through FY 1985 and in summary form for 1986-89.

In interpreting the data on investment needs, an important distinction must be made between needs assessment and capital planning efforts. Estimating needs, whether in terms of current backlog or projected growth and expansion, reflects criteria based on nationally-developed engineering specifications, air and water quality standards, and similar quantitative absolute yardsticks. Needs assessment based on such standards is a technical statement unconstrained by either political or fiscal considerations. In contrast, the long-range capital planning process usually involves a curtailment of unconstrained needs assessments in light of both pragmatic political realities and realistic projections of expected

revenues. Quite obviously, a summary of investment needs may vary substantially depending on whether the source document was developed within a needs assessment or a capital planning framework. The discussion of investment needs in the following sections will identify the extent to which the source data represent absolute or constrained needs estimates.

Projection of future revenues likely to be available to meet investment needs represents a most difficult task beyond the very short term (i.e., beyond a four to five year period). This is particularly the case for estimates of federal revenues in an extremely volatile budgetary period when funding levels are being drastically cut. Requirements for a State and/or local match add a further layer of complexity due to the interconnections of funding streams. A decrease in federal appropriations, for instance, results in a lower State and local matching requirement but must be offset by an increase in direct State appropriations. Seen from a different perspective, the potential for increasing federal revenue flows may be limited by the ability to provide the local match, an issue with particular significance given the trend toward increasing the local share required in more and more federal programs. Finally, there may be built-in restrictions on potential increases in revenues imposed by the capacity to manage and administer capital spending projects. There is thus a direct link between the potential scale of capital funding and the operating budgets and personnel costs in the State agencies responsible for implementing capital projects.

The following section details expenditure trends and estimated needs for the basic infrastructure categories addressed in the case study (transportation, water supply, and wastewater treatment). The subsequent section addresses the revenues projected to meet these needs.

TRANSPORTATION

Strategically located on the New York-Philadelphia-Washington corridor, New Jersey's unexcelled accessibility has been an important drawing card for attracting industry and people. Providing this accessibility is a transportation network comprising 33,400 miles of Interstates, State highways, county roads, and city streets, nearly 6,000 bridges, 33 public airports, 1,575 route miles of railroad track, and an extensive mass transit system including passenger rail and bus service. Maintaining the critical transportation linkages within the State has historically commanded a substantial share of funds available for capital projects. This share has fallen dramatically in recent years in part reflecting the completion of several major interstate highway projects. The New Jersey Department of Transportation (NJDOT) accounted for 47 percent of the State's capital expenditures during the 1969-76 period but this share fell to 19 percent in the period 1974-81.[10] An additional -- and significant -- component of New Jersey's transportation infrastructure, which is not represented in the following discussion, is under the jurisdiction of several corporate Authorities with independent bond-issuing status. These include the New Jersey Turnpike Authority, the New Jersey Expressway Authority (Atlantic City Expressway), the New Jersey Highway Authority (Garden State Parkway), and several regional or bi-state authorities such as the Port Authority of New York and New Jersey. The three transportation Authorities operating solely within the State had $1.02 billion in out-standing debt as of June 1981.[11]

Highways and Bridges

New Jersey's highway and road system is one of the most heavily used in the nation. The system supports 50.4 billion vehicle miles of travel a year, ranking eighth in the nation on this measure of highway usage. With 4.9 million registered vehicles, there are 148 vehicles registered for every mile of roadway, well over twice the national average. Only 26.3 percent of total road and highway mileage in the State is within the Federal Aid system, although this accounts for 70.5 percent of annual traffic volume (Exhibit 2). Fully 89 percent (29,728 miles) of the State's road system is under the jurisdiction of county and municipal governments. Since only 5,106 miles, or 17 percent, of these local roads are within the Federal Aid system, the State, counties, and local governments bear a considerable share of costs for road construction and maintenance.

Of the 5,786 bridges in the State, 2,265 (39.1 percent) are on State highways, 2,418 (41.8 percent) are on local roads, and 1,103 (19.1 percent) are railroad bridges. Of the latter, 116 road-over-rail bridges and 562 rail carrying bridges are under the jurisdiction of the New Jersey Transit Corporation (NJ TRANSIT), an independent public corporation providing bus and rail mass transit services. There are an additional 425 road-over-rail bridges (most related to Amtrak and Conrail facilities) over which jurisdiction is unclear.

Data on the current condition of State roads and bridges reveal the need for a major commitment of revenues for maintenance and rehabilitation. According to data from the New Jersey Department of Transportation (NJDOT), 84 percent of State roads are categorized as either fair, poor, or very poor. Only 16 percent are rated as good or very good. The detailed breakdown of road condition is as follows: 4 percent very good; 12 percent good; 44 percent fair; 38 percent poor; 2 percent very poor.

EXHIBIT 2

NEW JERSEY HIGHWAY INVENTORY, 1979

	Roads & Streets in Service		*Annual Vehicle Miles*	
	Miles	*Percent*	*Million*	*Percent*
Federal Aid System				
Interstate	331	1.0	5,929	11.8
State Primary System	1,455	4.4	10,154	20.1
State Secondary System	1,882	5.6	2,497	5.0
Federal Aid-Urban System	5,106	15.3	16,941	33.6
Non-Federal Aid				
Arterials & Collectors				
Urban	254	0:8	2,745	5.4
Rural	1,578	4.7	2,181	4.3
Local Streets & Roads				
Urban	14,593	43.7	9,183	18.2
Rural	8,197	24.5	767	1.5
TOTAL	33,396	100.0	50,397	100.0

Source: N.J. Department of Transportation, Bureau of Data Resources, Table TA-1, 1979.

NJDOT's evaluation of bridge condition in the State indicates a somewhat better yet still significant situation: 16 percent of the State's bridges are rated as either fair or poor. The distribution is as follows: 70 percent excellent; 14 percent good; 9 percent fair; 7 percent poor.

Reflecting these conditions, NJDOT estimates a current backlog in needed maintenance and rehabilitation for the State's roads and bridges of $1.5 billion. This total includes $700 million for road resurfacing and rebuilding of poor and very poor roads, and $800 million of bridge repairs and improvements required to bring the State's bridges to an 80 sufficiency rating.

Expenditure Patterns. Revenues for construction, rehabilitation, and maintenance of New Jersey's highways, roads, and bridges have come from three primary sources: Federal aid, State General Fund revenues, and general obligation bond issues. As one of only seven states in the nation that do not dedicate highway user revenues specifically for transportation purposes, New Jersey draws directly from General Fund revenues to finance the bulk of the State portion of transportation costs. A five-cent-a-gallon increase in the gasoline tax earmarked for transportation needs proposed by Governor Kean in late 1982 failed by one vote to reach approval in the Legislature. As a result, revenues collected from the gasoline tax and other user fees (e.g., motor vehicle fees) are deposited in the General Fund and appropriated to meet the full panoply of state needs. In 1981, for instance, New Jersey collected approximately $544.3 million in gasoline taxes and motor vehicle fees, while only $284 million was appropriated for transportation in that year.[12] As one account observes: "The $3 billion backlog of needed repairs to the state's highway system is about equal to the amount of state gasoline tax and motor vehicle license fees diverted to nontransportation uses since New Jersey abandoned the

dedication of such revenues to transportation purposes in 1947. Past administrations and legislatures gradually diverted more and more gas tax and license fee revenues to fund other programs where needs seemed more pressing."[13]

An additional important source of revenues for transportation projects has been provided in two recent bond issues approved by the voters. The 1968 State Transportation Fund authorized the issuance of $640 million for transportation improvements, of which $440 million was reserved for improving the State highway system and the remaining $200 million was reserved for mass transit improvements. The total amount of this bond fund was appropriated by FY 1981. The 1979 Transportation Rehabilitation and Improvement Fund was established from the proceeds of a $475 million bond issue. This amount includes $245 million for State highway improvements, $150 million for public transportation, and $80 million for State aid to local governments. According to the 1982 Annual Capital Improvement Plan, $20 million of this local aid is being used to provide the local match required for federal apportionments for bridge repairs. The remaining $60 million available for local aid is divided into two categories: (1) $12 million for road improvement projects facilitating urban revitalization; and (2) a $48 million 3R program (resurfacing, restoration and reconstruction) for local roads not eligible for federal aid. The 1982 CIP notes noncommittally that the Department of Transportation has received over $450 million in local applications for this $48 million component of bond funds for local projects.[14]

EXHIBIT 3

STATE AND FEDERAL EXPENDITURES FOR INTERSTATE AND STATE HIGHWAY FACILITIES, 1977-1982
(in millions of dollars)

	FISCAL YEARS					
	1977	*1978*	*1979*	*1980*	*1981*	*1982*
1. Federal Funds						
Capital Construction						
F.A. Interstate, primary, rural, and urban	89.4	80.1	88.0	97.8	67.9	42.5
Bridge and Highway Safety	3.8	4.3	4.4	1.3	3.4	0.6
Transportation Construction Engineering	14.6	15.4	15.3	12.8	-	-
Maintenance	0.1	0.1	0.5	0.3	0.4	0.3
Sub-Total	107.9	99.9	108.2	112.2	71.7	43.4
2. State General Fund Revenues						
Capital Construction						
F.A. Interstate, primary, rural, and urban	20.4	17.3	27.1	19.7	13.4	3.5
Bridge and Highway Safety	-	-	-	-	0.3	-
Transportation Construction Engineering	11.1	12.4	12.0	14.0	17.0	15.2
Non-Federal Aid Highway Projects	3.1	23.4	8.3	14.8	6.9	9.3
Maintenance	40.7	47.1	50.2	45.5	50.4	55.0
Sub-Total	[illegible]	100.2	97.6	94.0	88.0	83.0
3. State General Obligation Bonds	5.2	4.3	5.5	1.4	71.0	113.2
TOTAL	188.4	204.4	211.3	207.6	230.7	239.6

Source: New Jersey State Budgets, Fiscal Years 1978/79 to 1982/83; New Jersey Department of Transportation, Division of Transportation Planning and Research.

Total state and federal expenditures for state highway and bridge improvements have continued at a fairly stable level over the period 1977 to 1982 (Exhibit 3); the 4-5 percent average annual increase in expenditures has been less than the rate of inflation. Within this total level of expenditures, however, the mix of funds by source has altered dramatically over the six-year period. Federal funds for capital construction hovered near the $90 million level each year between 1977 and 1980, then fell to less than $70 million in 1981 and reached only $42.5 million in 1982. As a consequence, total federal expenditures for Interstate and state highway facilities in 1982 amounted to less than half the level of expenditures in actual dollars in 1977.

The decline in federal expenditures has been largely offset by an increase in funds from state sources over the six-year period (Exhibit 3). Expenditures of State General Fund monies actually declined from a peak of $100 million in 1978 to $83 million in 1982. These declines, however, were offset by a major increase in state bond funding allocated to state highway improvements beginning in 1981 as a result of the 1979 Transportation Rehabilitation and Improvement Bond Fund coming on stream.

Within these categories, the proportions of federal funds allocated to highway construction projects, bridge and highway safety projects, transportation construction engineering, and highway maintenance have remained fairly stable over the period (Exhibit 3). The maintenance category represents a combination of roadway and bridge maintenance projects and electrical and traffic operations (highway lighting, sign illumination, traffic signals, etc.). Not included in these figures are Transportation Department expenditures for physical plant construction and maintenance (offices, garage and maintenance facilities, salt and chemical

storage facilities, etc.) or funds for equipment maintenance and operations. The very small federal contribution to State highway maintenance costs has been devoted entirely to lighting and signal improvements (Electrical and Traffic Operations). Transportation construction engineering refers to design review, supervision, and inspection of construction projects and for State highways has been divided on roughly a 45/55 State/federal basis over most of the six-year period. Non-federal aid highway projects refer to State highway construction projects that are not within the Federal-aid programs, or to non-eligible costs of projects resulting from design specifications upgraded beyond federal requirements. As indicated in Exhibit 3, these costs have fluctuated widely from $3.1 million to $23.4 million annually over the period.

The pattern of funding for local highway facilities has varied substantially depending on the magnitude of federal funding (Exhibit 4). Federal funds for local road and bridge projects increased from $18.3 million in 1977 to a peak of $42.2 million in 1981 and then fell to $36.1 million by 1982. The State match for urban and rural roads (25 percent) and bridges (20 percent) rose and fell in lock-step with the fluctuation in federal receipts. Other State General Fund expenditures for local roads include approximately $1.5 million a year for county and municipal aid for lighting costs at the intersections of State and local roads, and approximately $2 million a year for engineering and design services. As in the case of the State highway system, the increase in G.O. bond obligations for local roads beginning in 1980 reflects the portion of the 1979 Transportation Bond Issue reserved for State aid to county and local roads.

EXHIBIT 4

STATE AND FEDERAL EXPENDITURES FOR
LOCAL HIGHWAY FACILITIES, 1977-1982
(in millions of dollars)

	FISCAL YEARS					
	1977	*1978*	*1979*	*1980*	*1981*	*1982*
1. Federal Funds						
F.A. Rural and Urban Systems	10.5	21.2	22.8	25.5	14.3	25.0
F.A. Bridge and Highway Safety	7.8	9.3	11.9	16.7	10.7	11.1
Sub-Total	18.3	30.5	34.7	42.2	25.0	36.1
2. State General Fund Revenues						
F.A. Rural and Urban Systems	4.0	10.2	15.8	12.1	4.8	4.3
F.A. Bridge and Highway Safety	0.6	0.7	0.6	1.3	0.8	0.1
County and Municipal Aid	1.9	1.5	4.8	1.3	1.4	1.5
State Aid Road System	6.5	5.6	9.4	4.5	0.5	3.7
Local Aid Engineering and Project Administration	1.8	1.7	2.1	2.2	—	—
Sub-Total	14.8	19.7	32.7	21.4	7.5	9.6
3. State General Obligation Bonds	-	-	-	23.8	21.1	31.3
TOTAL	33.1	50.2	67.4	87.4	53.6	77.0

Source: New Jersey State Budgets, Fiscal Years 1978/79 to 1982/83; New Jersey Department of Transportation, Division of Transportation Planning and Research.

A preliminary rough estimate of County and municipal expenditures for roads and bridges can be obtained from the County and Municipal Infrastructure Survey conducted jointly during Spring 1982 by the County and Municipal Government Study Commission and the New Jersey Division of State and Regional Planning. Because of the recency of this data gathering effort, survey results are available only in preliminary and summary form as of this writing. Estimates of capital investment and maintenance expenditures (exclusive of State and federal aid) were reported by 19 of the State's 21 counties for the period 1977-1981. Average annual capital expenditures during this period varied widely by County, ranging from a low of $120,000 to a high of $2.97 million. Calculated on a per mile basis for County roads, annual capital expenditures by Counties over the five years ranged from only $760 to $12,320. The 19 counties reporting capital expenditure data account for 82.7 percent of total road miles in the State under County jurisdiction. These 19 counties in total reported an annual average expenditure for capital construction of $26 million. If this sum represents average annual capital expenditures on 82.7 percent of County roads in the State, total County capital expenditures for roads and highways can be estimated to have averaged $31.5 million a year for the 1977-1981 period. A similar procedure reveals that total County road maintenance expenditures (again exclusive of State and federal monies) averaged $27.1 million a year during 1977-81. In addition, data from 18 counties indicate an annual average statewide capital expenditure of approximately $11.7 million for bridges under County jurisdictrion and an additional $3.5 million annual outlay for bridge maintenance.

The County and Municipal Infrastructure Survey reports local road expenditure data for 99 municipalities that responded to the survey. The average municipality responding to the survey contained 61 miles of local streets on which it spent an average of $2,189 per mile per year in capital outlays and $6,463 per mile per year in maintenance projects. Once again, these figures represent own-source local municipal monies exclusive of federal and State aid. Given an estimated 22,000 miles of local streets not on the Federal Aid system and not under County jurisdiction, capital expenditures by municipalities during 1977-81 averaged $48 million a year and annual maintenance outlays reached $142.2 million on an annual basis.

To summarize the preceding discussion, total Federal and State transportation expenditures for State and local roads and bridges actually declined in constant 1980 dollars over the 1977-82 period (Exhibit 5). Allocations for State highways and bridges declined steadily in real terms from 1977 to 1980, experienced a slight upturn in 1981 as a result of a major infusion of Transportation Bond funds and then dropped to an even lower level in 1982. Since bond funds have been entirely appropriated, it seems likely that future years will evidence a continuation of the long-term downward trend in the absence of further funding initiatives approved by the voters. Federal and State expenditures for local roads and bridges increased steadily in real terms from 1977 to 1980, dropped precipitously in 1981, and recovered only slightly in 1982. In sum, federal and State funding for State and local transportation needs peaked (in constant dollars) in 1978, and despite a slight upturn in 1982 have still not reached the level of funding attained at the beginning of the period.

EXHIBIT 5

TOTAL STATE AND FEDERAL TRANSPORTATION EXPENDITURES ON STATE HIGHWAYS AND LOCAL ROADS, 1977 - 1982
(in millions of constant 1980 dollars)

	FISCAL YEARS					
	1977	*1978*	*1979*	*1980*	*1981*	*1982*
State Highways	256.2	258.2	239.9	207.6	211.7	201.4
Local Roads	45.0	63.4	76.5	87.4	49.2	64.7
TOTAL	301.2	321.6	316.4	295.0	260.9	266.1

Source: Data in Exhibits 3 and 4 converted to 1980 dollars using the all-items CPI.

Investment Needs. A comprehensive survey of transportation needs in the State is provided in New Jersey Department of Transportation's 1981 New Jersey Transportation Plan and 1983 Seven-Year Capital Improvement Program. The State Transportation Plan contains both a "Short-Range Plan," specifying highway and mass transit investment needs between 1981 and 1988, and a "Long-Range Plan" setting forth broad transportation objectives for the State through the year 2000. NJDOT's Seven-Year Capital Improvement Program (hereafter NJDOT-CIP) represents a compilation of project needs for 1983-1989 as presented to the Commission on Capital Budgeting and Planning for preparation of the State's Capital Improvement Plan. Amplification and clarification of the NJDOT data are provided in the commentary contained in the Commission on Capital Budgeting and Planning's CIP and in additional information on bridge conditions provided by NJ TRANSIT and on State highway resurfacing backlog provided by NJDOT.

The transportation needs assessment and capital planning process in the State is aimed at the primary goal of improving the existing transportation system by completing essential missing links, relieving congestion, and improving safety and efficiency. Construction of new facilities and significant expansion are decidedly secondary objectives in the State's transportation planning effort.

Within this framework, specific project needs included in the Short-Range Plan and the NJDOT-CIP are identified from a number of sources. These include:

1) surface condition inspections completed routinely by maintenance staff;
2) bridge inspections conducted in compliance with Federal Highway Administration sufficiency evaluation requirements;
3) transportation planning activities undertaken by both NJDOT and six regional Metropolitan Planning Organizations within the State, aimed at closing gaps within the system and identifying needed capacity increases associated with demographic and economic growth trends; and
4) projects initiated within the State and local political process at the request of the legislature or an individual legislator, County freeholder, or municipality.

Projects identified within this framework are evaluated against a lengthy set of criteria prior to inclusion in the Short-Range Plan and the NJDOT-CIP. Among these criteria are:

1) basic safety and engineering standards;

2) social goals, including enhanced accessibility to employment and cultural facilities, equity in provision of transportation services, and improved accessibility for the elderly, handicapped, and disadvantged;

3) economic goals, including coordination with land development planning, preventing negative impacts on existing businesses, and providing economic development opportunities;

4) environmental goals, including protecting and improving air and water quality, and minimizing noise pollution, community disruption, and aesthetic degredation;

5) land use development goals, including promoting urban revitalization, improving suburban and rural accessibility, and preserving agricultural land and open space; and

6) energy conservation goals, including encouragement of energy-efficient transportation modes, multi-purpose trip-making, and coordination with the N.J. Department of Energy's conservation programs.

In addition to consideration of the above broad sets of Statewide planning goals, potential projects are evaluated in terms of:

7) scheduling requirements, including a realistic assessment that the project can be completed within the seven-year planning horizon, and overall constraints on the total number of projects that can reasonably be administered and supervised within a given time period.

Finally, and perhaps most importantly, both the Short-Range Plan and the NJDOT-CIP incorporate:

8) explicit recognition of revenue constraints.

As stated in the State Transportation Plan, "The Short-Range Plan has been developed in recognition of transportation funding problems as well as a

deep public concern for the problems of energy consumption and for the social and environmental impacts of transportation." While the total cost of projects identified in both the Short-Range Plan and the NJDOT-CIP exceeds available revenues by a considerable margin, neither document constitutes an unconstrained "wish list" compiled in disregard of the realities of anticipated funding levels.

In recognition of these constraints, the Short-Range Plan includes a listing of projects under the heading of "Additional Unmet Needs." Among these are projects identified in current planning studies or studies completed subsequent to preparation of the CIP, and projects included in the CIP but which may require expansion and/or additional funding. As stated in the Short-Range Plan, "it is important that these needs be identified and be ready to be implemented should additional transportation funds become available." However, no total or itemized cost estimates are provided for these projects in the Short-Range Plan. As a consequence, the needs estimates summarized here should be understood to underestimate total investment needs by a significant margin.

Total investment needs for highway, road, and bridge construction, replacement, rehabilitation, and maintenance identified in the 1983-1989 NJDOT-CIP, the Short-Range Plan, and NJDOT Office of Planning and Research amount to $6,966.3 billion (Exhibit 6).

The NJDOT-CIP projects a 400-mile interstate highway system within the State. To date, 330 miles of interstate have been completed, with 70 miles in planning or construction. The cost of construction on these remaining segments during the 1983-1989 period is $891.9 million (Exhibit 6). An additional $211.7 million of needed investment is forecasted for interstate resurfacing during the seven-year period, divided on a 75 percent federal, 25 percent State matching basis.

EXHIBIT 6

HIGHWAY AND BRIDGE INVESTMENT NEEDS FROM FEDERAL, STATE AND LOCAL SOURCES, 1983-1989
(in millions of 1982 dollars)

Category	*Total Investment*
Interstate Highways	
New construction	$ 891.9
Resurfacing, rehabilitation, and repair	211.7
State Highways	
F.A. consolidated primary system	311.1
F.A. urban system	81.2
Non-Federal Aid (100% State)	1,090.5
Construction engineering	147.6
Local Roads	
F.A. urban system	244.5
F.A. rural secondary system	36.9
State Aid highway reconstruction	376.3
Construction engineering	12.0
Bridge Replacement	
State highways	1,681.8
Local roads	46.2
Miscellaneous	
Highway betterments (including maintenance and resurfacing backlog)	783.1
Hazards elimination projects	25.8
Rail highway crossing elimination	22.1
Interstate de-designation	295.1
County and municipal aid for lighting	11.7
Total State and Federal	$6,269.5
County and Local Capital Projects*	696.8
TOTAL	$6,966.3

*Note: County and local needs are identified for 1981-1988 from the NJDOT Short-Range Plan, converted here to 1982 dollars.

Source: New Jersey Department of Transportation, 1983 Seven-Year Capital Improvement Program; New Jersey Commission on Capital Budgeting and Planning, 1982 Annual Capital Improvement Plan; NJDOT, New Jersey Transportation Plan: Short-Range Plan, 1981, NJDOT, Office of Planning and Research.

State highway construction needs over the period total $1.5 billion; three-fourths of this amount is allocated to construction projects on 100% State highways ineligible for federal aid. An additional $147.6 million of need is projected for construction engineering costs on State highway projects.

State and federal investment needs for local road systems total $669.7 million for 1983-1989. Of this amount, $376.3 million in State aid funding is required for local and municipal road projects not eligible for federal aid.

Federal aid bridge replacement projects total $1.7 billion, most of which is allocated for bridges within the State highway system. This distribution reflects the low proportion of local roads within the Federal Aid system, and seriously underestimates total bridge replacement and repair costs. The "miscellaneous" category of needs summarized in Exhibit 6 includes highway resurfacing and maintenance costs under the "Betterments" heading and related maintenance and improvement needs.[15]

Investment needs for the 23,000 miles of County and local roads not on the Federal Aid system are more difficult to quantify. A report prepared in 1978 by the County and Municipal Government Study Commission on "Local Highway and Road Programs" draws a somber conclusion:

> At the municipal level there is a critical need for some form of additional aid for reconstruction and resurfacing of 91 percent of all municipal roads which are now ineligible for aid -- greater than twice the total sum of all State, county and municipal road miles which are eligible for aid.

The County and Municipal Infrastructure Survey completed jointly in 1982 by the County and Municipal Government Study Commission and the Division of State and Regional Planning provides additional estimates of local road

conditions and needs.

Counties responding to the survey generally assess roads under their jurisdiction to be in reasonably good condition. Only 8.7 percent of County road miles on the Federal Aid system and 12.9 percent of mileage off the Federal Aid system were judged to be in Poor or Very Poor condition. On the other hand, only 8 of 19 responding Counties consider their current road renewal program to be adequate, and fewer than half of the Counties (9) indicated they resurface or reconstruct more than 5 percent of their total highway mileage each year -- the rate that would equal the 20-year renewal cycle generally considered adequate.

Municipalities responding to the survey reported an even less satisfactory situation. These municipalities rated nearly 20 percent of roads and streets under their jurisdiction as either Poor or Very Poor, with this proportion virtually identical for local roads on and off the Federal Aid System. Fully two-thirds of responding municipalities consider their current reconstruction/rehabilitation programs to be inadequate. Total capital investment needs for County and local roads identified in the Short-Range Plan (1981-1988) amount to $696.8 million (Exhibit 6).

Railroads

There are some 1,575 route miles of railroad track in New Jersey, nearly 85 percent of which is owned and operated by Conrail, a corporate entity independent of the State government. In addition, Amtrak owns and maintains trackage on the mainline through New Jersey between Philadelphia and New York. The primary direct State involvement in rail operations is under the jurisdiction of NJDOT's Office of Freight Services. The

Northeast Rail Services Act of 1981 allows Conrail to abandon freight lines which are unprofitable or underutilized. The Office of Freight Services administers the acquisition, rehabilitation, and maintenance of rail lines listed for abandonment by Conrail which are deemed critical to the economic well-being of the State.

Expenditure Patterns. Expenditures by the Office of Freight Services totalled $4.7 million for the six-year period 1977-1982 (Exhibit 7). Federal grants were the main source of these funds, accounting for 96.8 percent of public expenditures over the period. An additional 10 percent State match was provided for rail acquisition in 1979, and a 20 percent match for rehabilitation costs was provided by private railroad operators involved in the projects. The $4.7 million expenditure over the six years accounted for acquisition of 50.1 miles of track, accelerated maintenance on 28.3 miles, and rehabilitation of 67.6 miles of track.

Investment Needs. The Office of Freight Services projects a total of $26.9 million in needed revenues for rail acquisition and rehabilitation for the period 1983-1990. Of this amount $9 million (33.5 percent) is slated for acquisition and the remainder ($17.9 million) is needed for rehabilitation. Some $17.8 million of the total will be expended during 1983-87, with the remaining $9.1 million for 1988-90. No firm estimates of need are available for the period beyond 1990. This sum represents total planned investment over the eight-year period, as distinct from an assessment of need in an absolute sense. It is important to note, however, that since Federal budget cutbacks have effectively eliminated Federal grants as a source of these funds, the Commission on Capital Budgeting

EXHIBIT 7

N. J. RAIL FREIGHT EXPENDITURES,
BY SOURCE, 1977-1982
(in thousands of dollars)

SOURCE & PURPOSE	1977	1978	1979	1980	1981	1982	TOTAL
Rail Acquisition							
Federal	944		1,359				2,303
State Gen'l Fund			151				151
Accelerated Maintenance							
Federal		91	91	123	378		683
Rehabilitation							
Federal				216	216	1,174	1,606
TOTAL PUBLIC FUNDS	944	91	1,601	339	594	1,174	4,743

Source: N.J. Department of Transportation, Division of Transportation Planning and Research; NJDOT, Office of Freight Services.

and Planning CIP allocates the entire projected need of $26.9 million from State General Fund revenues.

Mass Transit

The provision of public transportation services in the State is the responsibility of the New Jersey Transit Corporation (NJ TRANSIT). NJ TRANSIT is an independent public corporation established in December 1979 as the successor to the Commuter Operating Agency within NJDOT. Public transportation facilities under NJ TRANSIT jurisdiction include both commuter rail and transit bus services operating throughout the State. In addition, the Port Authority of New York and New Jersey operates the PATH (Port Authority Trans-Hudson) rapid transit service between Newark and Manhattan, and the PATCO (Port Authority Transit Company) Division of the Delaware River Port Authority operates rapid transit service between Lindenwold, N.J. and Philadelphia. The following discussion focuses only on services and facilities directly under NJ TRANSIT jurisdiction.

The heaviest concentration of both rail and bus services is, as expected, in the densely-populated northeastern section of the State within the New York-Northeastern New Jersey urbanized area (Exhibit 8). Nearly 90 percent of annual commuter rail train-miles and 80 percent of transit bus vehicle-miles in the State are concentrated in this New York City commuter zone. NJ TRANSIT-operated facilities represent a vast network comprising 142 train stations and 1,053 passenger rail cars as well as 17 principal bus terminals and 1,597 commuter buses.[16] Operation of these services involves the State in an extensive subsidization of public transportation

EXHIBIT 8

NJ TRANSIT COMMUTER RAIL
AND BUS OPERATING DATA, BY URBANIZED
AREA, 1979

	COMMUTER RAIL		COMMUTER BUS	
URBANIZED AREA	Route Miles	Train Miles (in thousands)	Route Miles	Vehicle Miles (in thousands)
NY-Northeastern NJ	302.2	4,473	10,791.9	83,844
Philadelphia	69.3	72	1,694.3	8,293
Trenton	44.3	333	886.9	6,891
Atlantic City	42.6	53	643.3	4,286
Allentown-Bethlehem-Phillipsburg	31.8	50	121.4	542
Vineland-Millville-Bridgeton			220.9	828
Salem County			61.3	436
TOTAL	490.1	4,981	14,420.0	105,120

Notes: Route miles are the number of miles along a route over which commuter rail or transit bus service regularly operates.
Train miles and vehicle miles are the number of miles travelled by commuter trains and transit buses, respectively.

Source: NJ TRANSIT Data Book, August 1981.

services. In fiscal 1982, the State subsidized 2.9 million commuter rail passenger trips per month at a subsidy cost of $2.37 per trip; for the same year, the State subsidized 11.5 million bus riders per month at a subsidy cost per passenger of $0.54.[17] Additional State operating subsidies provide reduced fares for the elderly and handicapped during off-peak hours.

Expenditure Patterns. NJ TRANSIT data on expenditures are not easily available on an annual basis, or according to a detailed analysis by source. Nonetheless, a summary of total obligations of funds is available for contracts signed in the period 1974-1981, in which federal funds were granted (Exhibit 9). Not included in these data are obligations of funds for State-only funded projects (i.e., those for which no federal aid was received) other than bond funds. As a consequence, the data underestimate total expenditures during the period by the amount of State General Fund appropriations devoted to the portion of NJ TRANSIT operations not eligible for federal funds.

Federal funds used for new facilities (Exhibit 9) included construction of a new rail maintenance facility and acquisition of two major bus operators. The replacement/significant upgrading category includes expenditures for electrification of the North Jersey Coast Line Division, upgrading of the Raritan Valley line and the Newark city subway system, a statewide station upgrading program, and a rail equipment and bus purchase program. Major rehabilitation projects include $14.6 million for passenger car rehabilitation and $6.5 million for bus rehabilitation; none of these funds had been obligated through fiscal year 1981.[18] The $24.7 million in project funds for maintenance is entirely devoted to track rehabilitation and repair.

EXHIBIT 9

NJ TRANSIT OBLIGATIONS, BY SOURCE
AND PURPOSE, 1974-1981
(in millions of dollars)

PURPOSE	*Federal (UMTA)*	*State*	*Total Project Funds*	*Obligations*	*Percent Obligated*
New Facility	35.1	0.1	35.2	32.1	91.2
Replacement or Significant Upgrading	639.1	110.6	749.7	689.1	91.9
Major Rehabilitation or Repair	18.9	2.2	21.1	0	0
Maintenance	23.2	1.5	24.7	13.6	55.1
TOTAL	716.3	114.4	830.7	734.8	88.5

Note: State column does not include $61.7 million ($30.7 million obligated) in TRANSPAC funds from the Port Authority of New York and New Jersey for bus and equipment purchase and rehabilitation. Also not included in the table are obligations of funds for State-only funded projects (i.e., no federal aid) other than bond funds.

Source: N.J. Department of Transportation, Division of Transportation Planning and Research.

An additional indication of the magnitude of recent public transportation expenditures is provided from the amount of federal Urban Mass Transportation Administration (UMTA) capital funds obtained by NJ TRANSIT. UMTA capital grants (commitments) in actual dollars were as follows (in millions of dollars):

1975	$136.5	1980	$164.0
1976	39.1	1981	170.8
1977	44.5	1982	162.7
1978	50.0		
1979	108.1	TOTAL	$875.7

On the basis of these trends, NJ TRANSIT projects likely receipts of approximately $150 million in UMTA grants per fiscal year through 1986.

Investment Needs. Future investment requirements for public transportation are defined in NJDOT's Short-Range Plan for 1981-1988 and NJ TRANSIT's Seven-Year Capital Program covering 1984-1990. In parallel with the capital program for highways and bridges, the major emphasis in both these documents is on maintaining and revitalizing existing facilities, rather than engaging in significant expansion or new construction. This emphasis is mandated by the poor condition of the physical plant left by the bankrupt private railroad companies, and by the need to replace capital spent over a long time period on what is now a seriously aging infrastructure.

Major categories of need within this framework include track and bridge rehabilitation, rail rolling stock acquisition and replacement, rail station improvement, bus service facility renovation, and support facility improvement. Major new capital investment planning is keyed directly to estimated potential savings in operating expenses resulting from improved efficiency; NJ TRANSIT's Capital Program identifies four projects involving

new capital investment that together would provide an estimated $9.9 million annual savings in operating expenses.

Both the Short-Range Plan and the Capital Program are capital planning documents incorporating fundamental assumptions on available funding levels. Specification of needs in both documents is constrained by these funding assumptions. NJ TRANSIT's Capital Program projects annual capital funding from all sources for fiscal 1984-1986 in the range of $245 million. Including a 10 percent contingency for "over-programming" to provide for greater planning flexibility yields an annual capital budget of $270 million, which is the amount of need identified in each of the first three years of the Capital Program. Thus, the estimate of need specified in this document is constrained to equal projected capital funding availability plus ten percent. Total capital spending needs identified on this basis amount to $1.55 billion for the period 1984-1990.

Public transportation capital spending requirements for 1981-1988 are also detailed in NJDOT's Short-Range Plan, although the extent of funding constraints built into these estimates is less clearly specified. Investment needs identified in the Short-Range Plan for the 1983-1988 period total $1.79 billion in 1982 dollars (Exhibit 10). These figures will be used here as the specification of need least constrained by projected receipts.

Of the total investment need of $1.79 billion, $867.9 million (49 percent) is devoted to commuter rail and rapid transit needs, $704.7 million (39 percent) is earmarked for improving transit bus service and facilities, and the remaining $214.3 million (12 percent) pertains to bus and rail support projects including passenger facilities.

Under the commuter rail category, nearly half of identified funds ($412.8 million) are needed for replacement or major upgrading of service.

Projects in this category include the completion of electrifiction of the North Jersey Coast Line, improvements to the Newark City Subway, station and equipment upgrading on the Raritan Valley Line, replacement of the Raritan River Bridge, and extension and improvements to additional existing routes. Additional funds are needed for extensive rolling stock conversion, replacement, and rehabilitation, rail station restoration, systemwide track rehabilitation, and construction of a repair/rebuild and service/inspection facility.

Transit bus investment needs identified in the Short-Range Plan include $475.6 million for the purchase of approximately 250 buses per year between 1983 and 1988 to allow for cyclic replacement of buses after twelve years, and an additional $67.6 million for bus rehabilitation and repair. Funds are needed as well for repair and rehabilitation of bus facilities including garages and terminals, and for the purchase and installation of fare boxes, radios and support equipment, and bus operations support vehicles. The final category of Bus and Rail Support Projects (Exhibit 10) includes construction of a rapid transit-bus terminal facility in Camden, Hoboken Terminal improvements, bus shelter construction, development of park-and-ride facilities, and associated upgrading and improvement of both fixed facilities and rolling stock. The emphasis on rehabilitation and upgrading of existing facilities is evident throughout this listing of investment needs.

Airports

The New Jersey airport system comprises 33 public-use airports and approximately 100 additional privately-owned, private-use airports. Only the former, public use airports, will be considered here. Of these, four

EXHIBIT 10

PUBLIC TRANSPORTATION INVESTMENT NEEDS
FROM FEDERAL AND STATE SOURCES, 1983-1988
(in millions of 1982 dollars)

Category	*Total Investment*
Commuter Rail Needs	
Major rail construction	$ 412.8
Rail rolling stock conversion/upgrading	119.6
Rail fixed facility/right-of-way improvements	142.8
Rail fixed facility and equipment upgrading	128.5
Maintenance facility upgrading	64.2
Sub-total	867.9
Transit Bus Needs	
Bus purchase	475.6
Bus rehabilitation	67.6
Bus fixed facility upgrading	127.5
Bus support vehicles and equipment	34.0
Sub-total	704.7
Bus and Rail Support Projects	214.3
TOTAL	$1,786.9

Source: NJDOT Transportation Plan, Short Range Plan; amounts converted to 1982 dollars.

are classified as air carrier airports, 7 as basic transport, 10 as general utility, and 12 as basic utility airports. Fourteen of the 33 public-use airports are publicly owned and the remaining 19 are in private ownership. With only one or two exceptions, the larger air carrier and basic transport airports are publicly owned while the smaller general and basic utility airports are privately owned. Of the total number, 4 are rated in excellent condition, 23 in good condition, and 6 are in fair condition.[19] Newark International Airport, the largest in the State, and Teterboro Airport, a freight and general aviation facility, are owned and operated by the Port Authority of New York and New Jersey.

Expenditure Patterns. Total public expenditures for airport construction, rehabilitation, upgrading and maintenance for the period 1977-81 amounted to nearly $29 million, with an additional $2.3 million expended for facilities and equipment (Exhibit 11). In addition to these public expenditures, $1.5 million from private sources was spent primarily for hangar and runway construction at smaller general utility airports In most cases, public funds were distributed on a 90 percent federal, 10 percent county or city matching basis. The local match for capital projects at Newark and Teterboro was provided by the Port Authority of New York and New Jersey.

The total of $3.7 million for new construction was allocated to a new terminal building at Newark Airport (in 1978) and access road construction at Newark and Trenton. Improvements included under the replacement and rehabilitation categories involved hangar and runway construction, lighting and navigational aids, apron and taxiway construction, and land acquisition. Maintenance expenditures were allocated for runway; apron, and taxiway overlays, building maintenance, lighting, and fencing.

EXHIBIT 11

PUBLIC CAPITAL EXPENDITURES FOR
PUBLIC-USE AIRPORTS, 1977-1981
(in thousands of dollars)

	FISCAL YEARS					
	1977	*1978*	*1979*	*1980*	*1981*	*Total*
New Construction						
Airports		2,086		1,619		3,705
Facilities and Equipment	200	100				300
Replacement or Upgrading						
Airports	1,910	451	400	704		3,465
Facilities and Equipment	235	150	200	300	100	985
Major Rehabilitation						
Airports	338	2,398	615	5,520	5,103	13,974
Facilities and Equipment			285	40	225	550
*Maintenance**						
Airports	190	1,037	3,525	1,624	1,453	7,829
Facilities and Equipment	85	10	55	100	225	475
TOTAL						
Airports	2,438	5,972	4,540	9,467	6,556	28,973
Facilities and Equipment	520	260	540	440	550	2,310

Note: *Maintenance expenditures of privately-owned, public-use airports are not included in these figures.

Source: NJDOT, Airport Development Aid Program for Public Use.

In addition to these capital expenditures, a total of $2.3 million in outlays was allocated to facilities and equipment. This entire sum is funded through federal grants, and pertains primarily to communications, lighting, navigational, and electronic systems.

Investment Needs. Capital investment needs for upgrading and maintaining the State's system of public-use airports have been summarized by NJDOT's Division of Transportation Planning and Research. Sources used for the Division's projections of needs include the 20-year airport development plan completed by NJDOT in 1975 (The New Jersey State Airport System Plan, 1975) and NJDOT's State Aviation Facilities Improvement Program prepared in 1982.

Investment needs for the periods 1982-1987 and 1988-2002 are listed by category of need in Exhibit 12. These data reveal a total investment need of $57.3 million for the first six years of the planning period and an additional $120 million for the period 1988-2002. Ninety percent of this estimated cost is allocated to construction and improvement of the airport system while the remainder is assigned to purchase and upgrading of facilities and equipment. A total of $1.1 million is estimated for new heliport construction.[20]

In both the initial and subsequent periods covered by these data, the largest share of funds is allocated to new construction needs. These include terminals, maintenance, fire and rescue buildings, access roads, and the like, and account for well over half of total airport development needs in each period. In most cases, the items included in the remaining project categories correspond to those identified in the discussion of expenditure patterns above.

EXHIBIT 12

AIRPORT TRANSPORTATION INVESTMENT NEEDS,
1982-1987 AND 1988-2002
(in thousands of 1982 dollars)

	1982-1987	1988-2002
New Construction		
Airports	27,627	72,650
Facilities and Equipment	2,805	1,870
Heliports	1,116	3,444
Sub-total	31,548	77,964
Replacement or Upgrading		
Airports	18,422	32,129
Facilities and Equipment	1,848	3,082
Sub-total	20,270	35,211
Major Rehabilitation		
Airports	3,732	3,109
Facilities and Equipment	150	400
Sub-total	3,882	3,509
Maintenance		
Airports	1,549	3,226
Facilities and Equipment	30	120
Sub-total	1,579	3,346
Total		
Airports	51,330	111,114
Facilities and Equipment	4,833	5,472
Heliports	1,116	3,444
GRAND TOTAL	57,279	120,030

Source: Data compiled by NJDOT, Division of Transportation Planning and Research.

WATER SUPPLY, TREATMENT AND DISTRIBUTION

New Jersey's water supply system encompasses an extremely complex and multilayered set of facilities, institutions, and agencies that has evolved over many decades. There are a total of 619 separate purveyors serving the State's water needs. Of these, 309 are public utilities, authorities, or water departments, and 310 are private water companies. The Statewide Water Supply Master Plan indeed identifies five categories of water purveyors comprising the State's water supply system: (1) private investor-owned systems; (2) municipality-operated systems; (3) regional water commissions; (4) water authorities; and (5) State-operated utilities.

The proliferation of individual purveyors, and the dichotomy between public and private provision of water, are a function of the development history of the State. Many of the largest purveyors, e.g., Hackensack Water Company, Elizabethtown Water Company, Newark Water Department, etc. are located in the most densely-settled northeastern part of the State and date back to the Civil War. (For instance, the Elizabethtown Water Company was formed in 1854.) In contrast, a large number of very small purveyors serve the southern and western parts of the State, and in many cases represent private water companies established by a developer or builder to serve a single subdivision. The 25 largest purveyors, including 6 private purveyors, account for fully 82 percent of water diversions. Data on price schedules show a substantial diversity, ranging from a low of $2.44 per 10,000 gallons to a high of $20.50 per 10,000 gallons. In general, rates charged by private purveyors exceed those asked by public purveyors, although both the high and the low examples cited above are charged by municipal agencies.

A further major dichotomy in the State centers on the source of water supply. The northern half of the State relies mostly on surface water supplies (reservoirs, lakes, and rivers) while the southern half is heavily dependent on ground water. For planning purposes, the State is divided into six water supply regions recognizing this basic dichotomy in intake sources (Exhibit 13). The largest amount of water diversions in absolute terms is from surface water sources, reflecting the far higher population size and density in the northern counties. Total annual water diversions from surface sources in 1975 amounted to 581.2 mgd, compared to only 372.4 mgd from ground water sources.

The pattern of water demand, as well as projected deficits in water supply, reflect the regional distribution of population in the State (Exhibit 14). The Northeastern New Jersey counties comprising Planning Region 1, accounting for a major proportion of the State's population, also account for 72 percent of current water demand. The largest projected deficits in water supply are also concentrated in this region.

Water supply needs and projected deficits were calculated in the Water Supply Master Plan based on six factors:

(1) population projections for counties;

(2) regional characteristics of residential water use;

(3) changes in residential water use rates over time due to trends in land use patterns, increased ownership of home appliances, and extension of public sewer services;

(4) projected trends in county economic base;

(5) variations in water requirements by different industrial sectors; and

(6) changes in industrial water use as a result of increased recirculation.

EXHIBIT 13

STATE OF NEW JERSEY

WATER SUPPLY
PLANNING REGIONS

N. J. STATEWIDE WATER SUPPLY MASTER PLAN

Water supply needs calculated on the basis of these factors were compared in the Water Supply Master Plan with projected intake capacity to yield the deficit projections summarized in Exhibit 14. The discussion of investment needs below centers on the requirement to offset these projected deficits while renabilitating and maintaining existing systems.

Expenditure Patterns. A clear picture of recent expenditure trends is difficult to obtain because of the extreme fragmentation of the system and the way the data are kept. Reliable estimates of expenditures for rehabilitation, upgrading and maintenance are available only from each individual purveyor, and clearly would vary widely in quality and coverage. Estimates of expenditures for construction of new facilities are available from permit data maintained by the N.J. Department of Environmental Protection, Bureau of Potable Water. According to these data, public expenditures for new facility construction between 1977 and 1981 totalled $52 million for water supply and storage facilities, $59 million for water treatment facilities, and $59 million for water distribution networks. For fiscal year 1982, total public expenditures were $9 million for water supply and storage, $7 million for treatment, and $12 million for distribution. Private investment over the same periods totalled $33 million for the three types of systems combined during 1977-81 and $6 million during 1982. Federal grants accounted for $8.5 million of this amount over the full 1977-83 period, from sources including the Farmers Home Administration, the Department of Housing and Urban Development, and the Economic Development Administration. Nearly $40 million in State funds, including monies from the 1981 Water Supply Bond Issue, went to the development of State-operated facilities, including reservoir construction and improvement, capacity improvements in the Delaware and Raritan Canal, and pipeline construction.

EXHIBIT 14

WATER DEMAND AND PROJECTED
WATER SUPPLY DEFICIT, BY REGION
(in million gallons per day, mgd)

Region	*Water Demand 1976*	*Projected Water Supply Deficit 1980*	*1990*	*2000*
1. Northeastern N.J.	756	63	107	151
2. Monmouth and Ocean counties	79	12	30	38
3. Atlantic and Cape May counties	28	5	16	17
4. Cumberland and Salem counties	21	0	2	5
5. Burlington, Camden, and Gloucester counties	107	5	15	26
6. Northwestern N.J.	56	4	11	18
TOTAL	1,047	89	181	255

Source: New Jersey Department of Environmental Protection, Division of Water Resources, The New Jersey Statewide Water Supply Master Plan, April 1982.

Nearly $140 million in local funds were allocated to capital improvements during the period.

Investment Needs. Critical areas identified in the Water Supply Master Plan include declining water quality, inadequate interconnections between systems and fragmentation of the water supply network, needed source development, and inadequate controls over ground water resources. To counteract these problem areas, the Master Plan recommended actions needed specific to Planning Regions as well as actions to be implemented on a state-wide basis. On a regional basis, the Master Plan identifies $94.5 million in projects in Region 1 to provide an increase of 124 mgd needed to offset the projected deficit, and an additional $40 million in Region 2. In addition, actions required in all Regions include:

* Interconnections. Linkages between and among key sectors of the water supply system are crucial to allow for redistribution from water surplus to deficit areas. Identification, testing, and rehabilitation of existing interconnections is needed, as well as construction of new interconnections to fill critical gaps.

* Drought and emergency response plans. Planning for drought and emergency response is inadequate, and in most cases has proceeded on a crisis-response basis. Development of local and statewide plans is required incorporating increases in supply capabilities and procedures for curtailment of demand.

* Planning information storage and management. The highly disaggregated nature of the State's water supply and distribution system requires development of a centralized data storage, monitoring, and retrieval system.

* Water quality protection. A comprehensive program for watershed and aquifer protection is critical to support continued adequacy of water supply. This includes both remedial programs involving pollution abatement and cleanup as well as preventive measures including regulatory enforcement, disposal systems, and monitoring and control.

* Conservation. In addition to usage limitations, substantial conservation can be achieved through comprehensive monitoring of water losses, repair of leaking, damaged, and antiquated systems, and improved efficiency in water distribution. Older systems report an average 20-25 percent "unaccounted for" water, reaching as high as 40 percent in some cases. Replacement and repair of such systems is critical for improved delivery and conservation of supplies.

In addition to these statewide needs, the Water Supply Master Plan assessed the magnitude of capital needs for rehabilitation of the distribution systems of individual purveyors. An initial perspective on the scale of this need is also provided by the County and Municipal Government Study Commission's Infrastructure Survey conducted in 1982. Fully 45 percent of municipalities responding to the survey classified the condition of their water distribution system as fair or poor. The same proportion (44 percent) felt the reconstruction/replacement cycle for the distribution system serving their municipality was inadequate. In addition, 58 percent reported capital needs other than reconstruction/replacement, including insuring adequate pressure, expanding the supply and/or distribution system, and improving treatment capacity.

Capital needs for rehabilitation of distribution systems were identified for the Water Supply Master Plan through a survey of water purveyors. Several individual cases are illustrative of the scale of this need. The Jersey City Water Department, for instance, outlined a rehabilitation program extending over 20 years. The cost of replacement of old pipe and lining of other pipe was estimated at $27.6 million (in 1980 dollars). Additional needs including maintenance of transmission lines, covering of reservoirs, replacement of valves and water meters, and hydrant improvements brought total capital investment need to $53.6 million. The

Newark Water Department is renovating portions of its distribution system through implementation of a Capital Improvement Plan calling for an expenditure of $17.6 million. This amount, according to the city, covers "only a small portion of the actual need, which at this point is undefinable." Similarly, the Atlantic City Municipal Water Authority estimates a need of $31.6 million for replacement of mains, hydrants, and valves. This amount, however, does not include costs for pumping stations or treatment facilities.

Consultants for the Water Supply Master Plan received 47 survey responses from purveyors identifying a total need of $215 million for rehabilitation of distribution systems. The population served by these purveyors totals 4.6 million, yielding a per capita cost of $47. Assuming a total New Jersey population of 7 million yields a total statewide capital need of $330 million for rehabilitation of existing distribution systems (in 1980 dollars). The Master Plan, however, cautions that this sum quite likely underestimates actual need since some needs are not known, are underestimated, are known but not reported, or cannot easily be quantified.

These needs plus investment required by the State are summarized in an Action Program for 1981-1985 in the Water Supply Master Plan (Exhibit 15). Capital investment needs for this period total $836 million (in 1982 dollars). This total includes $219.5 million in State projects aimed primarily at interconnections and improvement of supply capacity. An additional $226 million is to be invested by private purveyors in large- scale reservoir development to improve supplies in the northern part of the State. The estimated need for rehabilitation and consolidation of local delivery systems swells to $392.5 million in 1982 dollars. In addition to these itemized needs, the Master Plan identifies additional supply projects

EXHIBIT 15

INVESTMENT NEEDS FOR WATER SUPPLY,
TREATMENT, AND DISTRIBUTION, 1981-1985
(millions of 1982 dollars)

CATEGORY	*TOTAL INVESTMENT*
IMPLEMENTATION BY THE STATE	
Water supply rehabilitation and consolidation	$ 77.3
Canal and reservoir supply improvements	105.1
Conservation program	1.2
Watershed and aquifer protection	9.5
Water treatment study	0.6
Supply feasibility studies	23.8
IMPLEMENTATION BY PRIVATE PURVEYORS	226.0
LOCAL DISTRIBUTION SYSTEMS	
Rehabilitation and consolidation	392.5
TOTAL	$836.0

Source: Estimates by the author from data in New Jersey Department of Environmental Protection, The New Jersey Statewide Water Supply Master Plan, April 1982; costs converted to 1982 dollars.

recommended by feasibility studies for which no cost estimate is provided. Finally, actions to increase supply and overcome expected deficits are sketched for the period 1985-2020, but no cost estimates are provided. Thus, the total investment need defined here is clearly a short-term, highly conservative figure that most likely underestimates actual need by a substantial margin.

WASTEWATER DISPOSAL SYSTEMS

As in the case of water supply, the State's wastewater disposal system is composed of an extensive decentralized network of municipal and regional facilities. The Division of Water Resources in the Department of Environmental Protection administers federal EPA's Wastewater Construction Grants Program which provides 75 percent of capital costs for wastewater treatment, collection, and disposal facilities. These funds, allocated under Section 201 of the Clean Water Act, are matched by an 8 percent State share (funded through G.O. bond revenues) and a 17 percent local share.

Expenditure Pattern. A total of $379 million has been expended on wastewater disposal system capital development in the State during the period 1977-1982 (Exhibit 16). Federal funds allocated under the 201 Program provide by far the largest share of these expenditures, making capital investment in wastewater disposal extremely dependent on fluctuations in federal funding allocations. The data in Exhibit 16 include only funds for new construction and substantial rehabilitation or upgrading; expenditures for maintenance of existing facilities are unknown and could be determined only by contacting each individual facility. Funds for treatment plants and for collector and interceptor sewers are predominantly for new construction. Combined sewers and storm drains are no longer

EXHIBIT 16

EXPENDITURES FOR WASTEWATER DISPOSAL SYSTEMS, 1977-1982
(in millions of dollars)

	Federal Grants	*State G.O. Bonds*	*Local Revenues*	*Other**
Treatment plants	254.4	26.6	56.6	40.1
Collector and interceptor sewers	252.1	27.1	55.4	159.3
Combined sewers and storm drains	6.7	0.2	0.5	-
TOTAL	513.2	53.9	112.5	199.4

Note: *This category includes projects not funded under the 201 Construction Grants Program, and may have been funded by one of the following: Farmers Home Administration, HUD, EDA, bonding by local municipalities, builders and developers.

Source: New Jersey Department of Environmental Protection, Division of Water Resources.

being constructed and funds in this category are predominantly for upgrading or rehabilitation.

Investment Needs. The 1982 Needs Survey conducted by federal EPA and the State Division of Water Resources has identified wastewater disposal needs in terms of both current backlog and projected needs to 2000.[21] As summarized in Exhibit 17, the cost of providing for the current backlog is $5.4 billion. This cost increases to $6.2 billion to meet expected needs given projected population in 2000.

According to the 1982 Needs Survey, the year 2000 projections assume construction of 20 new treatment plants with a capacity of 49 mgd and replacement or upgrading of another 100 plants with 1,000 mgd capacity. The same projections call for construction of 2,360 miles of new collector and interceptor sewers, and the replacement or upgrading of 1,636 miles of combined sewers and storm drains. Projected costs for these facilities are summarized in Exhibit 17.

REVENUE PROJECTIONS

Estimating the future flow of revenues available for capital improvements is far more an art than a science. The serious cutbacks in federal funding for domestic programs makes projections of revenues from this source particularly problematic. State and local funding sources are somewhat more managable if one accepts the validity of straight-line projections from recent levels. Inflation plays a role in adding ambiguity to this method.

Projections of State General Fund revenues have been calculated from data supplied by the Division of Budget and Accounting in the Department of the Treasury, using straight-line projections of each revenue source

EXHIBIT 17

INVESTMENT NEEDS FOR WASTEWATER DISPOSAL SYSTEMS, 1982-2000
(in millions of 1982 dollars)

Facility	*Backlog Need, 1980 Population*	*Projected Need, 2000 Population*
Secondary Treatment	1,847	2,187
Advanced Secondary Treatment	181	220
Advanced Treatment	97	133
Infiltration Inflow Correction	226	226
Major Rehabilitation of Sewers	2	2
Collector Pipe	440	577
Interceptor Pipe	614	852
Combined Sewers	2,015	2,015
TOTAL	5,426	6,215

Source: U.S. EPA, 1982 Needs Survey, Cost Estimates for Construction of Publicly-Owned Wastewater Treatment Facilities, December 31, 1982.

(Exhibit 18). These projections indicate total General Fund revenue receipts of $35.9 billion between 1983-87, or average annual receipts of $7.19 billion.

An alternative method for projecting State General Fund revenues is based on the historical relationship between State revenues and national GNP, on the assumption that receipts are keyed to both local economic conditions and New Jersey's ties to the national economy. Regressing annual General Fund receipts for 1978-1983 on annual GNP for the same period yields the relationship:

Revenues = -.516 + .002 (GNP)

Applying this relationship to GNP projections supplied by the Congressional Budget Office yields projected General Fund receipts of $36.7 billion for 1983-1987, or average annual receipts of $7.34 billion, slightly higher than the $7.19 billion estimated using straight-line projections. Recent evidence of a slowing of the inflation rate and consequent lower sales and personal income growth in coming years suggests that the lower estimate of General Fund revenues is the more reasonable.

Trends in recent years suggest that state monies for capital improvements amount to approximately 3.0 percent of total state revenues. Subtracting the debt service portion of those payments yields approximately 1 percent of total state revenues available for capital investment. Applying this formula to the data in Exhibit 18 yields approximately $360 million in State General Fund revenues for capital improvements during 1983-1987. Assuming further that the transportation, water, and sewage disposal services discussed in the preceding sections account for approximately 60 percent of total capital investment in the State (i.e., excluding parks and recreation, public institutions, corrections, beaches and harbors, flood control, and the like), yields $215.7 million in available State General

EXHIBIT 18

PROJECTED REVENUES, BY SOURCE,
1983-1987
(in millions of dollars)

Source	*Total Revenues*	*Average Annual Revenues*
State General Fund		
Sales tax	$ 9,231.3	$1,846.3
Income tax	10,128.3	2,025.7
Corporate tax	5,077.7	1,015.5
Racing, lottery, casinos	2,352.4	470.5
Other taxes	5,513.5	1,102.7
Other revenues	3,651.7	730.3
Total General Fund	35,954.9	7,190.9
General Obligation Bonds	1,000.0	200.0
Local Revenues		
Counties	8,000.0	1,600.0
Municipalities	27,500.0	5,500.0

Source: New Jersey Department of the Treasury, Division of Budget and Accounting; Department of Community Affairs, Division of Local Government Services.

Fund monies for the period 1983-1987, or $43.2 million per year.

The State's voters have approved approximately $200 million in General Obligation bonds per year since 1976, the maximum amount deemed prudent by the Department of the Treasury. Assuming a continuation of this trend yields $1.0 billion in G.O. bond revenues over the 5 year period 1983-1987 (Exhibit 18). Of the $2 billion in G.O. bond issues approved since 1976, approximately 50 percent has been dedicated to the transportation, water and sewer needs discussed above. Again assuming a continuation of this trend yields $500 million in G.O. bond revenues available during 1983-1987 for the purposes covered in this report.

Allowable increases in local government expenditures are severely constrained in New Jersey since passage of the Local Budget Law which effectively imposes expenditure limitations on local governments. Total revenues received by County governments have increased by no more than one to three percent a year since 1979, while total municipal revenues statewide have increased by less than four percent a year. Given these slow growth rates, local government revenues between 1983 and 1987 can be estimated at approximately $1.6 billion a year for Counties and $3.5 billion a year for municipalities (Exhibit 18).

Local government annual budgets for 1977 to 1982 reveal that capital outlays throughout this period have consistently amounted to some 7 percent of total revenues for both Counties and municipalities. Applying this formula to the local revenue data in Exhibit 18 yields an annual capital budget of $112 million in County monies and $385 million in annual municipal outlays over the 1983-1987 period. Once again assuming that the infrastructure categories discussed in earlier sections of this report

account for 60 percent of local capital outlays, we can estimate combined County and municipal revenues available totaling $298.2 million a year during 1983-1987.

As suggested above, projection of federal funding beyond the relatively near term is fraught with uncertainty. Estimates of the likely magnitude of future federal receipts have been provided by NJ TRANSIT for public transportation (UMTA) purposes, by the Department of the Treasury, Division of Budget and Accounting, and in data prepared in support of the Governor's Infrastructure Bank proposal. These estimates include annual receipts of $288 million in highway funds, $150 million in UMTA grants, $5.4 million for airport construction, and $77 million for wastewater treatment and disposal.

These projected revenue streams are delineated in Exhibit 19 together with a summary of revenue needs identified in the preceding sections. Annualized investment need for the infrastrucure categories discussed above totals $1.8 billion. Revenues available on an annualized basis total $962 million, for an annual average deficit of $837 million. Extending this amount over the period covered in this report yields a revenue gap of $4.2 billion for the period 1983-87, a gap of $10.9 billion for 1988-2000, and a total deficit of $15.1 billion over the period 1983-2000.

EXHIBIT 19

SUMMARY OF CAPITAL INVESTMENT NEEDS
AND REVENUES, 1983-1987
(in millions of 1982 dollars)

Investment Needs	Period	Total Need	Annual Average Need
Highways and bridges	1983-1989	$6,966.3	$ 995.2
Rail freight	1983-1990	26.9	3.4
Public transportation	1983-1988	1,786.9	297.8
Airports	1982-2002	177.3	8.4
Water supply	1981-1985	836.0	167.2
Wastewater treatment	1982-2000	6,215.0	327.1
TOTAL NEEDS			$ 1,799.1

Revenues	Period	Total Revenues	Annual Average Revenues
State General Fund	1983-1987	215.7	43.2
G.O. Bond Funds	1983-1987	500.0	100.0
Federal monies			
Highways	1983-1986	1,153.0	288.0
Mass transit	1983-1986	600.0	150.0
Airports	1982-1987	32.5	5.4
Wastewater treatment	1983-1987	385.0	77.0
County and municipal	1983-1987	1,491.0	298.2
TOTAL REVENUES			961.8
ANNUAL DEFICIT			($837.3)
Deficit 1983-1987			($4,186.5)
1988-2000			($10,884.9)

NOTES

1. "The Decaying of America," Newsweek, August 12, 1982, p. 12.

2. Patrick Choate, WG Special Report on U.S. Economic Infrastructure, The House Wednesday Group, 304 HOB Annex, Washington, D.C., May 1982.

3. Regional Plan Association, Economic Development and Public Infrastructure Investment for the New York Urban Region (New York: RPA, May 1982).

4. American Public Works Association, Revenue Shortfall: The Public Works Challenge of the 1980s (Chicago: American Public Works Association, 1981).

5. Tri-State Regional Planning Commission, Public Systems Today: A Guidebook on Preserving Infrastructure, New York, June 1982.

6. Regional Plan Association, Economic Development and Public Infrastructure Investment, p. 45.

7. Ibid, p. 46.

8. Port Authority of New York and New Jersey, The Condition of Urban Infrastructure in the New York-New Jersey Region: A Survival Issue for the 1980s, May 1979.

9. Interview with Division of Budget and Accounting, Capital Planning Unit staff, October 1982.

10. NJ Commission on Capital Budgeting and Planning, Annual Capital Improvement Plan, 1982, p. 248.

11. Annual Capital Improvement Plan, 1982, p. 338.

12. New Jersey State Budget, Fiscal Year 1982-83.

13. Newark Star-Ledger, July 27, 1982, p. 13.

14. NJ Commission on Capital Budgeting and Planning, Annual Capital Improvement Plan, June 1982.

15. Estimates of investment needs for the airport development program and rail freight acquisition and rehabilitation, included in the NJDOT-CIP, are discussed here under separate headings in subsequent sections.

16. NJ TRANSIT Data Book, August 1981.

17. New Jersey State Budget, Fiscal Year 1982-83, Evaluation Data, p. 291.

18. NJ TRANSIT obligations for FY 1982 are not yet available at this time.

19. NJDOT, "The 1980 Update State Airport System Plan Airports, Current Airport Service Roles, and Current Ownership."

20. The portion of future capital needs for Newark and Teterboro Airports that are funded by the Port Authority of New York and New Jersey is not included in this section or in the data in Exhibit 12.

21. U.S. Department of Environmental Protection, 1982 Needs Survey, Cost Estimates for Construction of Publicly-Owned Wastewater Treatment Facilities, December 31, 1982.